TOWARDS A QUALITATIVE UNDERSTANDING OF HUMAN CAPITAL IN ENTREPRENEURSHIP RESEARCH

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ABSTRACT

Purpose: This paper revisits the conceptualization and measurement of human capital in entrepreneurship research.

Design/methodology/approach: Using data from the Panel Study of Entrepreneurial Dynamics, the paper contrasts reflective and formative conceptions of human capital. It also applies qualitative comparison analysis (QCA) to derive an empirical typology of the human capital indicators in explaining venture emergence.

Findings: The paper shows that human capital is more appropriately seen as defined and formed by its indicators (education, work experience, entrepreneurial experience, industry experience, and managerial experience). In addition, the relationship between human capital and venture emergence is best represented as multiple, conjunctional causation, i.e. human capital matters through certain combinations of its indicators.

Originality/value: The paper suggests that a major re-orientation is necessary in terms of how entrepreneurship researchers view and use the construct of human capital: away from a single quantity and towards a qualitative combination of experiences. This opens up new questions and conversations about the role of human capital in the entrepreneurial process.

Key words: human capital, nascent entrepreneurs, qualitative comparison analysis, fuzzy set

INTRODUCTION

Human capital is a central theoretical construct in entrepreneurship research, as recent meta-analytical reviews show (Martin *et al.*, 2013; Unger *et al.*, 2011). It represents the knowledge and skills – whether general or specific to the task context – that individuals bring to a task they set out to perform and, as a basic tenet, is expected to improve task performance (Becker, 1975). Based on this intuitive and appealing premise, human capital has been used to predict a range of entrepreneurial outcomes such as becoming a nascent entrepreneur or self-employed, new venture formation, and new venture performance and survival. The challenge for empirical research, however, lies in translating the theoretical notion of human capital into valid operationalizations in empirical studies. The purpose of this paper is to critique the current practice of using disjointed proxies of education and experience and discuss how human capital can be represented in a more holistic manner.

Bruderl *et al.* (1992) emphasize the need to adapt the construct of human capital to the particular context of study and, accordingly, distinguish traditional indicators of general human capital (education and work experience) and three indicators of human capital specific to the context of entrepreneurship: entrepreneurial experience, industry experience, and managerial experience. Each of these five indicators offers a glimpse into the entrepreneurs' human capital and, to the extent that it is used in a study, can be expected to have a positive relationship with the entrepreneurial outcomes of interest. But as the brief review below suggests, the evidence for such relationships is relatively mixed. Rather than aim to provide a comprehensive overview of human capital in entrepreneurship research, this review serves to highlight the complexity of the relationship between human capital inputs and entrepreneurial outcomes, based on different

conceptualizations of human capital as well as contexts in which it is developed (Martin *et al.*, 2013; Unger *et al.*, 2011).

In regard to general human capital, there is evidence that both education and work experience increase the likelihood of engaging in start-up activities (Davidsson and Honig, 2003) and of venture survival (Bates, 1990; Bruderl *et al.*, 1992; Gimeno *et al.*, 1994). But equally, other studies have shown no relationship of these human capital indicators with business survival (Bosma *et al.*, 2004) or with the achievement of nascent business milestones (Davidsson and Honig, 2003).

For entrepreneurial experience, evidence suggests positive relationships with becoming a nascent entrepreneur (Davidsson and Honig, 2003), successfully founding a business (Rotefoss and Kolvereid, 2005), and the likelihood of future self-employment (Carroll and Mosakowski, 1987; Evans and Leighton, 1989). In addition, prior entrepreneurial experience can positively affect venturing progress but has no effect on the likelihood of first sale (Davidsson and Honig, 2003); and vice versa, it is associated with higher initial venturing progress but has no effect on subsequent progress (Samuelsson and Davidsson, 2009). Similarly, studies show a positive relationship between entrepreneurial experience and firm size (Bruderl *et al.*, 1992; Colombo *et al.*, 2004), profitability (Bosma *et al.*, 2004), and external funding (Chatterji, 2009) and, at the same time, no effect on new venture survival (Bosma *et al.*, 2004; Bruderl *et al.*, 1992; Delmar and Shane, 2003; 2004), the timing of new product introduction (Schoonhoven *et al.*, 1990) and new venture performance (West and Noel, 2009).

In regard to industry experience, there is tenuous relationship with successful transition from nascent to infant entrepreneur (Wagner, 2005), but also no relationship with venturing progress (Samuelsson and Davidsson, 2009). Similarly, some studies show a positive

relationship between industry experience and funding (Chatterji, 2009), and growth and survival (Bruderl *et al.*, 1992; Cooper *et al.*, 1994; Gimeno *et al.*, 1997; Pennings *et al.*, 1998; Stuart and Abetti, 1990), while others have found no effect on survival (Delmar and Shane, 2004), on the timing of new product introduction (Schoonhoven *et al.*, 1990), and on performance (West and Noel, 2009).

Finally, for managerial experience, some studies have shown it to have no effect on new venture survival but positive effects on various initial organizational characteristics (Bruderl *et al.*, 1992; Colombo *et al.*, 2004); others have shown the opposite, i.e. positive effect on organizational survival and no effect on business performance (Bosma *et al.*, 2004).

There are two ways to reflect upon and reconcile this mixed evidence. First, one can argue that different entrepreneurial outcomes are sufficiently complex and thus important contingencies or intervening factors may be omitted in the various studies (e.g. Dimov, 2010). Indeed, Unger *et al.*'s (2011) assessment clearly shows that an overall low relationship between human capital and entrepreneurial success subsumes a variety of moderating factors such as the nature or task relatedness of human capital, the business context, and the particular success measure chosen. Second, one can argue that the extant modeling of the relationships between the human capital indicators and entrepreneurial outcomes does not reflect the nature of the human capital construct. Indeed, models do not normally include all five indicators, perhaps reflecting an implicit assumption that they may be interchangeable as proxies of human capital. In addition, models typically include only the direct effects of the indicators, thereby ignoring any configurations among them.

This paper focuses on the second argument by revisiting the nature of the human capital construct and suggesting new approaches to its understanding and representation. In the next

section, it contrasts the reflective and formative conceptions of human and present evidence for the latter: rather than being interchangeable proxies of an underlying construct, the five human capital indicators are independent building blocks of human capital. In the third section, it elaborates on this formative relationship by exploring the distinct configurations among the five indicators, based on qualitative comparison analysis (QCA). In the fourth section, it re-examines these configurations as they relate to venture emergence.

REFLECTIVE AND FORMATIVE CONCEPTIONS OF HUMAN CAPITAL

The relationship between a theoretical construct and its measures represents an important yet overlooked aspect of theoretical reasoning (Edwards and Bagozzi, 2000). Edwards and Bagozzi distinguish two types of relationship, reflective and formative. In the first, a construct is viewed as a cause of its measures. Such measures are termed reflective as they represent manifestations of the same underlying construct. This conception underlies considerations related to reliability and factor analysis. It presupposes high correlation among the measures (indicators) and models these measures as a function of the underlying construct and (measurement) error (Kline, 2005). As such, reflective constructs require a minimal but not necessarily exhaustive set of consistent indicators.

In contrast, in the second conception, measures are viewed as causes of the respective construct. In this sense, the construct is formed by its measures. The classic example of a formative construct is socioeconomic status (SES), which is inferred from observable characteristics such as education, income, and occupational prestige (Heise, 1972), each of which contributes independently to the level of SES. More broadly, a formative construct is defined and caused by certain antecedent indicators (Edwards and Bagozzi, 2000) and does not presuppose high correlations among its indicators (MacKenzie *et al.*, 2005). Key to the development of

formative measures is the identification and use of an exhaustive list of relevant indicators (Diamantopolous *et al.*, 2008).

Conceptually, human capital can be more readily portrayed as a formative construct, i.e. as comprised of one's education and work, entrepreneurial, industry, and managerial experience. Changes in one's education or specific experience can increase human capital even of the other experiences remain unchanged. Therefore, properly capturing one's human capital requires inclusion of all relevant indicators of education and experience.

In order to compare the reflective and formative conceptions of human capital, the paper used data on nascent entrepreneurs from the Panel Study of Entrepreneurial Dynamics (PSED) II. This dataset represents the largest and most representative study of nascent entrepreneurial activity (Reynolds and Curtin, 2008), and has been used in over 120 peer-reviewed publications[1]. Although the data chosen here comes from the USA, the PSED methodology has been applied across a number of countries. Thus, there is an opportunity to replicate the results presented here across a number of different national contexts.

Data on Nascent Entrepreneurs' Human Capital

The PSED II contains a cohort of 1,214 nascent entrepreneurs, identified through the screening of a random sample of 31,845 adults between October 2005 and January 2006 and followed over 5 years, as explained in detail by Reynolds and Curtin (2008). In the initial phone interview, extensive data were collected on the nascent entrepreneur's characteristics, which enabled the construction of the five discussed human capital indicators. Education was measured on a 5-point scale, based on the question "What is the highest level of education you have

[1] Based on the PSED bibliography, updated July 2015 and available at http://www.psed.isr.umich.edu/psed/documentation

completed?" The answers to this question were grouped in five categories: below high school, high school, some college or vocational degree, bachelor's degree, and graduate studies. Work experience was measured by the years of paid, full-time work experience. Entrepreneurial experience was measured by the number of other businesses the respondent had helped start as owner or part-owner. Industry experience was measured by the years of work experience in the industry in which the new business would compete. Finally, managerial experience was measured by the number of years in which the respondent had had managerial, supervisory, or administrative responsibilities. All experience variables were logged.

In addition to the above five indicators of human capital, the analysis included two perceptual measures of human capital, based on the respondents' degree of agreement with the following statements: "Overall, my skills and abilities will help me start this new business" and "My past experience will be very valuable in starting this new business". These statements reflect the definition of human capital as the knowledge and skills relevant to a task at hand and were measured on a five-point scale, ranging from strongly agree (5) to strongly disagree (1).

Full set of data were available for 1,185 nascent entrepreneurs. Table 1 provides the descriptive statistics and correlations for the seven indicators of human capital. Notably, although these indicators exhibit positive inter-correlations, these correlations are relatively low.

--- Insert Table 1 about here ---

Analysis

The reflective and formative conceptions of human capital were compared in a structural equations modelling (SEM) framework. Since formative models are under-identified and thus cannot be estimated on their own (Bollen and Lennox, 1991), one recommended estimation

approach involves the addition of two reflective indicators (Diamantopolous et al., 2008; MacKenzie et al., 2005). The analysis used the measures of education and experience as formative indicators and the two perceptual measures of human capital as reflective indicators. In a first step, it compared the fit of this formative model with the fit of a model in which all seven measures were used as reflective indicators. The formative model exhibited good fit ($\chi^2(4) = 6.0$, $p > .1$; GFI = .999, CFI = .999, RMSEA = .021). In contrast, the reflective model exhibited poor fit ($\chi^2(14) = 478.6$, $p < .001$; GFI = .898, CFI = .681, RMSEA = .167). When only the education and experience variables were used as reflective indicators, the fit of the reflective model was better ($\chi^2(5) = 14.7$, $p < .05$; GFI = .995, CFI = .989, RMSEA = .041), but still worse than the fit of the formative model. Figure 1 provides a summary of the estimated models.

--- Insert Figure 1 about here ---

A second step of the analysis involved a vanishing tetrad test to evaluate whether the reflective specification of human capital represented a proper model structure (Hipp and Bollen, 2003). A tetrad is formed from four random variables and represents the difference of the products of the covariances of two different pairs among the four variables. A tetrad is vanishing when the said difference is zero. In determining whether a model is properly specified, the vanishing tetrad test is based on the notion that, given the model structure, some of its tetrads should be vanishing. In a reflective model, assuming that the error terms have no correlations among themselves and with the underlying construct, all tetrads implied by the model should be vanishing (Hipp and Bollen, 2003). A global test compares the observed covariance structure among the five variable with the covariance structure implied by the reflective model (Hipp *et al.*, 2005). The test indicated that the null hypothesis of all vanishing tetrads can be rejected ($\chi^2(5) = 15.19$, $p < .01$).

This analysis suggests that a reflective model is not a proper representation of human capital. While there is a common factor to the five indicators, this factor explains only a very small proportion of the variance of those indicators. Indeed, an exploratory factor analysis of the five indicators reveals that no other factors are evident in the data – the eigenvalue of the second factor is only 0.064. Therefore, one can conclude that the five indicators of human capital operate in an independent manner and so are more appropriately considered as its formative measures. The next section examines the nature of the formative relationships.

CONFIGURATIONS OF HUMAN CAPITAL INDICATORS

How can the human capital of two individuals with different experiences, both in terms of extent and nature, be compared? Can a higher educational degree be compared with a few extra years of entrepreneurial, industry or managerial experience? These are clearly difficult questions that go to the heart of our understanding of human capital as formed by its indicators. They suggest that, in terms of their human capital, individuals can be more meaningfully compared in a holistic rather than piecemeal manner.

Ragin (1987) distinguishes variable- and case-oriented approaches in making comparisons and studying relationships, each involving a trade-off between complexity and generality. The former approach reduces individual cases to a set of variables with the goal of discovering general relational patterns between these variables and an outcome of interest. In this approach, there is an implicit assumption that the sought effects exist independent of context. The latter approach treats individual cases as holistic configurations and seeks to appreciate the complexity of how their elements combine to produce certain outcomes. It is thus suitable for

studying conjunctional causation, i.e. when several conditions jointly determine an outcome of interest.

The particular method that arises from such configurational thinking, Qualitative Comparison Analysis (QCA) has gathered significant momentum in the organizational and management literature as a way of capturing the more complex nature of causality (e.g. Fiss, 2007; Greckhamer et al., 2008). It has also been successfully applied in the entrepreneurship literature as a means of understanding the effects of more holistic configurations of factors (Krause et al., 2014; Mandl et al., 2016; Muñoz and Dimov, 2015). The broad contribution of this work is to highlight the conjunctional and equifinal nature of the relationships that comprise the entrepreneurial process, whereby factors normally considered on a piecemeal basis are rarely sufficient on their own as they interplay with other conditions (Muñoz and Dimov, 2015). The next two sections outline the logic of the method and illustrate its application to deriving human capital configurations.

Methodological Considerations

The classic functional representation of a formative construct is as a linear combination of its indicators, i.e. $HC = \sum \beta_i x_i + \varepsilon$, where β_i and x_i represent respectively the weight and value of indicator (i). In this variable-oriented formulation, the individual components are added to produce a total human capital score. There are two challenges to this formulation. First, the total score is sensitive to the scale on which the individual indicators are measured. Even if the values of the individual indicators are standardized, there is an underlying problem that these indicators may have qualitatively different population distributions. Second, this formulation implicitly assumes that the different indicators are inter-changeable and mutually compensating. The ratio

$\beta_i/\beta j$ represents how many units of indicator (j) can be used to replace one unit of indicator (i) to produce the same total score. Therefore, a simple comparison of two total scores cannot offer meaningful insights into the combination of indicators that produce those scores. To the extent that this combination reflects some underlying career patterns, which give rise to qualitatively different human capital combinations, it is necessary to appreciate the complexity of one's human capital and to seek more qualitative human capital comparisons across people.

As a synthesis of the rigour of variable-oriented approaches and the appreciation of complexity inherent to case-oriented approaches, Ragin (1987) develops a qualitative comparison methodology based on Boolean algebra. The gist of this approach lies in identifying a set of relevant causal factors for an outcome of interest and constructing a "truth table" which shows the different combinations of those factors and the respective outcome for each combination. This approach is holistic by design and moves from maximum complexity towards some simplification of that complexity. In this method, the unit of analysis is the configuration of factors rather than the individual for whom these factors are measured. In the simplest, "crisp-set" version of this method, the factors of interest and the outcome are dichotomous in nature, i.e. they can take on a value of zero or one that indicate whether the factor is absent or present. Once a truth table is constructed, certain minimization algorithms can be applied to produce "prime implicants", i.e. configurations that cannot be reduced further and that can be combined to produce all the configurations in the original truth table. This is a process of bottom-up simplification in which two conditions that produce the same outcome but vary on one factor can be combined into a condition in which this factor is deemed redundant.

An extension of this qualitative comparison analysis involves moving from "crisp" sets, in which all factors are dichotomous, towards "fuzzy" sets (Ragin, 2000). In a fuzzy set

framework a factor can take on gradated values between zero and one. This allows the researcher to specify the conditions that allow specifications of conditions when the factor can be deemed absent, present or in between. Based on a multi-dimensional assessment of how close a particular combination of factors is to a crisp-set counterpart, a set of configurations is derived that represents a truth table. The fsQCA software (Ragin *et al.*, 2006) facilitates the production of the truth table – subject to the qualitative input provided by the researcher – and automates the minimization algorithms.

Empirical Illustration

For the human capital data on entrepreneurs from the PSED II dataset, a crisp-set application may not be appropriate. Indeed, to classify individuals as having vs. not having experience or having vs. not having education requires sensitive judgments about the point of dichotomization. This judgment is alleviated in a fuzzy-set analysis. An important first step in this analysis is the calibration of the variables, i.e. scaling them over the range from zero to one, with one indicating full inclusion in the respective set, zero indicating full exclusion from the set (Ragin, 2000). The calibration procedure involves the specification of at least three values representing respectively when a variable can be considered a clear member of the set, when it can be considered "in between", and when it can be considered a clear non-member (Ragin, 2006).

For the education variable, the calibration values used were 4, 3, and 2 (i.e. bachelor degree, some college or vocational degree, and high-school degree). Thus, individuals with at least a bachelor degree are considered as belonging to the education set, those with a high-school degree or less are considered as not belonging to that set, and the rest are considered in between the two sets. For entrepreneurial experience, the analysis used 2, 1, and 0 as calibration values.

That is, individuals who have helped start at least two other businesses are considered members of the entrepreneurship experience set and those who have not started other businesses are considered non-member. Those who have helped start one other business are considered in between. For the industry, and managerial experience variables 10, 5, and 1 were the calibration values. Thus, those with at least ten years of experience are considered "experienced", those with one year of experience or less are considered "not experience" and the rest are considered n between. Finally, for work experience the calibration values were 15, 10, and 5. Slight modifications of the calibration values produced results consistent with those reported below. Table 2 presents the distributions of the five variables across the different calibration categories.

--- Insert Table 2 about here ---

The truth table for this analysis is presented in Table 3. This table contains 32 conditions, i.e. all possible combinations among the five human capital indicators, and the number of cases for each condition. Each human capital indicator is represented by a single letter: D (education), W (work experience), E (entrepreneurial experience), I (industry experience), and M (managerial experience). In each condition (row), a 0/1 value reflects whether the indicator is present or absent in that condition. Thus, each condition represents a corner of the vector space as defined by the combination of indicators. A case is estimated to belong to a condition if it has greater than 0.5 membership in the respective corner of the vector space (Ragin, 2006). Notably, only 478 cases (out of 1195) are shown to belong to one of the 32 conditions. For an empirical typology, the outcome variable represents whether a condition is more or less prevalent. In this case, with 478 cases and 32 conditions, each condition is expected to have 15 cases if the cases are randomly distributed across conditions. Therefore, all conditions in which the number of cases exceeded 15 were coded as one and the remaining cases as zero.

--- Insert Table 3 about here ---

After performing the minimization algorithms, the following solution is derived:

$$HC = dWe + DWM + WIM + weim \qquad (1)$$

In this notation, whether the letter is uppercase or lowercase represents whether the particular indicator is present or absent in a particular condition. The multiplication operation in the above notation represents the Boolean "AND" and shows joint presence of several indicators. The addition operation represents the Boolean "OR" and is used to join terms that each constitute dominant representations of human capital. Thus, there are four such representations: no education, work experience, no entrepreurial experience (dWe); education, work experience, managerial experience (DWM); work experience, industry experience, managerial experience (WIM); and no work experience, no entrepreneurial experience, no industry experience, no managerial experience (weim).

Given that only 478 cases are captured by this analysis, the paper also examined the full range of cases using a crisp-set analysis, in which the human capital indicators were dichotomized along their median values (>3 for education, >10 for work experience, >0 for entrepreneurial experience, >5 for industry experience, and >7 for managerial experience). In addition, it also performed these analyses on the subset of "solo" nascent entrepreneurs, i.e. those operating alone on an independent business, in order to exclude the possibility that when entrepreneurs act in teams they may do so on the basis of complementary human capital. There were 532 solo entrepreneurs in the data and full data were available for 511 of them. The results from the three additional analyses are as follows:

(2) all cases, crisp-set: HC = dWM + WEM + WIM + weim + dwim + dwem

(3) solo cases, fuzzy-set: HC = WM + deim

(4) solo cases, crisp-set: HC = WIM + deim + dwim + dwem + dWEM

There are two patterns that are observed in these solutions. First, the fuzzy-set combinations seem to be a subset of the crisp-set combinations, due to their use of stricter criteria for inclusion in the different conditions. Second, the human capital combinations of solo entrepreneurs are generally a subset of the human capital combinations of all nascent entrepreneurs. This is to be expected, since among the entire group of entrepreneurs there may be those who only act because of the involvement of their partners who may bring some important missing skills.

Equation (3), derived from a fuzzy set analysis of solo entrepreneurs suggests that two dominant human capital constellations represent the majority of nascent entrepreneurs. The first involves a combination of work experience and managerial experience (WM). This combination is present in all of the other solutions as well. The second involves a combination of no education, no entrepreneurial experience, no industry experience, and no managerial experience (deim). Portions of that combination are also present in all of the other solutions. These two combinations are difficult to represent using a variable-oriented approach since they would require the construction of two-, three-, and four-way interactions that would not only pose statistical power challenges but also make interpretation very difficult.

HUMAN CAPITAL AND VENTURE EMERGENCE

As a final illustration of the utility of QCA, the paper examines the relationship between human capital and venture emergence in the context of the solo nascent entrepreneurs in the Panel Study of Entrepreneurial Dynamics II. The reason for the choice of solo entrepreneurs was

that for cases where more than one person was involved in starting a particular business, it would have been more difficult and complex to make attributions about the success or failure of the emerging venture to the human capital characteristics of the particular respondent.

The analysis was based on the first three follow-up interviews (the only ones available at the time). The nascent entrepreneurs in the study were questioned on the status of their business creation efforts. If the business had revenues, these revenues exceeded expenses for over 6 months, and if the expenses included salaries for the actively involved owners, the business was considered operational. If the business had not yet reached those milestones, but the nascent entrepreneurs (1) had time commitment to the business (more than 160 hours over the past 12 months and more than 80 hours in the next 6 months), (2) considered the venture to represent a major career focus over the next 12 months, or (3) still considered themselves actively involved, they were considered still actively trying to establish the business. Finally, when the nascent entrepreneurs acknowledged to be disengaged from the business, the venturing efforts were considered abandoned. Status information was available for 453 of the 511 solo entrepreneurs. Examination of the missing cases revealed that they were not different in terms of industry experience, but tended to have lower education, work experience, entrepreneurial experience, and managerial experience. Of the 453 venturing efforts with known status after 3 years, 203 (44.8%) were discontinued, 162 (35.8%) were still active, and 88 (19.4%) reached operating status.

The first analysis involved traditional statistical estimation of venturing status as a function of the nascent entrepreneur's human capital characteristics. For ease of comparison across analyses, it used only the human capital variables in the model. Introducing additional controls, such as whether the business had revenue or whether the nascent entrepreneur had

devoted full time to the business at the time of the initial interview, did improve the explanatory power of the model but did not change the effects of the human capital variables. The categorical nature of the venturing status variable led to two estimations: (1) a multinomial logic model with the middle category (still active) as the baseline, and (2) a logit model in which the middle category was excluded and direct comparison was made between the abandoned and operating status cases.

The results of the two estimations are shown in Table 4. In the multinomial logit model, none of the human capital variable help explain the reaching of operating status. In regard to abandonment, industry experience had a negative and significant effect ($p < .01$), suggesting that nascent entrepreneurs with greater industry experience were less likely to abandon their venturing efforts. In the logit model, both industry and managerial experience had positive and significant effects ($p < .05$). This suggests that when comparing the abandoned and operating status cases, the latter involved nascent entrepreneurs with greater industry and managerial experience.

--- Insert Table 4 about here ---

The second analysis involved a qualitative comparison among the nascent entrepreneurs based on fuzzy sets. It calibrated the venturing status variable so that operating status and abandonment were considered respectively members and non-members of the venture emergence set and the still active category was considered in between. The truth table is shown in Table 5. Following established recommendations, the analysis focused only on the conditions with at least seven cases, thus capturing 82% of all cases (Ragin, 2006). It then coded the outcome variable as zero or one based on the degree each condition was estimated to belong to the set of operating businesses. The truth table in fuzzy-set analysis offer two measures of the degree to which a

particular corner of the vector space – as defined by the combination of indicators – belongs to the outcome set: consistency and proportional reduction in error (pre). The former represents the degree to which membership in the particular condition is a consistent subset of the outcome set. The second represents the degree to which the error in predicting the outcome is reduced if one knows the condition to which a case belongs. The product of the two measures can be used to identify gaps in the range of consistency measures and thus draw the line between the two categories of the outcome variable. In this case, the outcome was coded as one for 3 conditions and as zero for the remaining 9 conditions.

--- Insert Table 5 about here ---

The application of the minimization algorithm produced the following solution:

VE = dWIM + DWEm

It suggests that two combinations of human capital indicator are associated with reaching operating status: no education, work experience, industry experience, and managerial experience (dWIM) and education, work experience, entrepreneurial experience, and no managerial experience (DWEm). In both cases the nascent entrepreneur has extensive work experience, but in one case it is complemented by extensive industry and managerial experience (and less education), while in the other case it is complemented by more education and extensive entrepreneurial experience (and low managerial experience). Most importantly, none of the human capital indicators are singly associated with the nascent entrepreneur's reaching operating status. Overall, this solution illustrates multiple conjunctional causation at work: different combinations of human capital indicators can produce different venturing outcomes.

A comparison of the two analyses leads to some interesting insights in regard to the way in which QCA complements and extends the variable-oriented analysis. First, work experience is

not highlighted in the logit analyses. This can be due to the fact that work experience matters not so much through its single variation across cases but through the way it is combined with other human capital indicators. Such complex relationships are very difficult to uncover in variable-oriented analysis since the inclusion of many higher-order interaction terms can significantly impede the interpretation of the results. Second, industry and managerial experience, while individually important in the logit analyses, are combined in the qualitative comparison. This highlights the limitations to statistical control in the variable-oriented approach. The interpretation of the individual coefficients in the logit models is based on the condition "other things being equal". But to the extent that the human capital indicators form meaningful combinations and that certain such combinations are more likely than others, then the "other things" cannot really be equal. Finally, the qualitative comparative analysis shows that education and entrepreneurial experience, while not notable in the logit analyses, can contribute to venture emergence in certain combinations with the other human capital indicators.

DISCUSSION

This paper revisits the conceptualization and measurement of human capital in entrepreneurship research. Although human capital has been widely used to predict a range of entrepreneurial outcomes, inconsistencies in empirical findings raise pertinent questions about the nature of its operationalization, particularly the practice of using five different indicators as interchangeable proxies. A comparison of reflective and formative conceptions suggests that the latter is more appropriate, i.e. as a construct, human capital is defined and formed by its individual indicators.

In considering the five human capital indicators together, the paper moves beyond a linear combination and explores their holistic configurations using qualitative comparison analysis. The results suggest that the human capital of nascent entrepreneurs can be represented in terms of two primary, qualitatively different combinations of indicators: (1) work experience and managerial experience, and (2) lack of education, lack of entrepreneurial experience, lack of industry experience, and lack of managerial experience. Certain combinations of indicators are also associated with venture emergence. Both the empirical typology and the conjunctional causation patterns offer novel and valuable insights to entrepreneurship researchers and suggest promising avenues for aligning human capital theory with the reality of (nascent) entrepreneurs.

This work suggests that a major re-orientation is necessary in terms of how entrepreneurship researchers view and use the construct of human capital. Human capital represents the collection of knowledge and skills – derived from education or experience – that an entrepreneur possesses and can put to use in the context of particular venturing efforts. This collection is most appropriately represented by not only jointly considering the relevant sources of knowledge and skills but also understanding how these sources are combined in individual entrepreneurs. In a way, the term "capital" is misleading as it superimposes a notion of a homogenous medium that is characterized largely by its amount, just like financial capital.

The original conception of human capital was introduced in order to measure the returns to years of education and experience, on the assumption that each year of accumulation represented a unit that is consisted and interchangeable across different domains of experience. The time has come to acknowledge the limits of the capital analogy and consider that the human application deals with different dimensions. Thus, whereas financial capital can have many sources, they are ultimately assembled in the same bank account: £10 million of financial capital

can be assembled from different sources, all to the same effect. In contrast, the sources of human capital each feed into different pockets of accumulation and thus various knowledge and skills: 10 years of total experience can amount to qualitatively different capacities depending on the individual experience of which they are composed (e.g. education, industry, managerial, entrepreneurial).

This call for a qualitative understanding of human capital is not new. Indeed, Dimov and Shepherd (2005) demonstrated that the source of experience for venture capitalists was essential for understanding their investment performance; there were important nuances to the broader labels of 'general' and 'specific' as applied to human capital. Similarly, Unger *et al*. (2011) distinguish outcomes of human capital investments (knowledge or skills) from the human capital investments themselves (education or experience), with the former exhibiting overall stronger effects on entrepreneurial performance. Gabrielsson and Politis (2012) show that different types of functional and industry experiences have different effects on the generation of new business ideas. And Zikic and Ezzedeen (2015) argue that human capital forms part of a broader set of entrepreneurial career capital.

The current paper contributes to this line of thought both by making a case for a different theoretical logic (i.e. configurational) in discussing human capital and by demonstrating the advantages of a different methodological approach to match it. This raises a new set of questions for future research related to whether and how human capital matters for becoming an entrepreneur and for entrepreneurial success. For instance, does the composition of experience make a difference? To what extent can different experiences compensate one another? What experiences are best complements for different levels of education? Pushing the qualitative understanding even further, we can consider that even the same amount of experience can be

accumulated with different intensity, thereby questioning whether time itself is the most appropriate unit of experience.

In regard to empirical representation of human capital, there is a need to move away from a single score that captures quantity rather than quality, towards a qualitative combination of various human capital indicators. Using human capital variables (i.e. quantities) enables us to focus on and analyse a large number of cases, at the expense of depersonalizing each individual case and removing it from its context. This is due to treating each unit of human capital as identical replication, regardless of its source. As a result, the relationships such measures represent tend to subsume much heterogeneity as to weaken their effects (Unger *et al.*, 2011) and thus to be difficult to apply to or understand in particular cases. In contrast, the QCA framework discussed in this paper allows appreciation of the complexity of individual cases while also retaining the ability to examine a large number of cases.

The contribution of QCA analysis is threefold. First, through the use of calibration, it draws a distinction between theoretically relevant and irrelevant variation, as separated by the threshold of full membership in a case category. For example, if we consider 10 years to be a threshold beyond which any one would be considered very experienced, then the difference between 15 and 30 years of experience should be considered theoretically irrelevant (i.e. both cases are very experienced). And yet, in a quantitative sense, they are different by a factor of 2. While the differences in experience between 1 and 2 years, between 3 and 6 years, and between 8 and 16 years are represented by the same factor of 2, we intuitively feel that they are not the same. In this regard, calibration provides alignment between our theoretical arguments and empirical measures. It enables quantitative measures to be recast in terms of the shades of quality that signify theoretical relevance.

Second, the QCA methodology enables us to address the issue of limited diversity, i.e. the fact that the full combinations of variable values are not observed in our empirical settings (Ragin, 1987). Related to this is the asymmetry in the operation of a factor, namely that the effect of its presence is qualitatively different from the effect of its absence. In a linear modelling framework, this asymmetry is lost as the effects of increasing and decreasing the value of a factor are considered mirror images of one another. Thus, when an effect is positive, one automatically presumes that increasing the value of the factor will increase the value of the output; and that decreasing the value of the factors is deemed to decrease in the value of the output. With calibration one can pinpoint whether an effect is due to the increase of a positive factor or a decrease of a negative factor. As QCA emphasized equifinality – i.e. reaching the same outcome through different configurations of factors – it is possible that different degrees of particular experiences can be effective when put in combinations with other experiences. Thus, we should not automatically assume that if more entrepreneurship experience is better then less entrepreneurial experience necessarily makes things worse. Someone who lacks such experience may find compensating qualities in other aspects of their education or professional experience.

Finally, the QCA methodology offers a new tool for dealing with configurations of factors. While the idea of configurations is not new, its methodological application has been restrained by modelling limitations. For instance, Wiklund and Shepherd (2005) model configurations as a three-way interaction within a linear model framework. This approach effectively limits the number of interacting variables to three and does not consider whether the interaction values are theoretically relevant or map out the full combinations of their components. Similarly, De Clercq, Dimov, and Thongpapanl (2010) model configurations as deviations from an ideal typology of three factors. Due to the need to covert the deviations into

numerical values, this approach assumes that the high-high-high combination is the best, thereby limiting the empirical exploration of the data. In addition, no distinction can be made between low-high-high, high-low-high, and high-high-low combinations if they produce the same deviation scores. Thus, while the variance decomposition approach employed in linear modelling is methodologically rigorous, it downplays the meaning of the numerical representations it employs. In contrast, the QCA method – through its emphasis on calibration and reliance on different analytical logic – retains the complexity and theoretical meaning of its representations.

CONCLUSION

In conclusion, the appeal of the construct of human capital in entrepreneurship research reflects the intuitive notion that entrepreneurs are different in terms of what they bring to the table. How to conceptualize and operationalize such differences has been long limited by a notion of capital grounded in economics thinking and in the procedural rigour of multivariate modelling. By highlighting the qualitative nature of human capital as a constellation of experiences and discussing a new logic for its representations and analysis, this paper hopes to open up new conversations about the role of human capital in the entrepreneurial process. The recent growth of the QCA community within the Academy of Management (and beyond) is a testament that this is indeed a very productive direction.

REFERENCES

Bates, T. (1990), "Entrepreneur human capital inputs and small business longevity", *Review of Economics and Statistics*, Vol. 72 No. 4, pp. 551-559.

Becker, G. S. (1975), "Human Capital", Chicago University Press, Chicago, IL.

Bollen, K. and Lennox, R. (1991), "Conventional wisdom on measurement: A structural equation perspective", *Psychological Bulletin*, Vol. 110 No. 2, pp. 305-314.

Bosma, N., van Praag, M., Thurik, R. and de Wit, G. (2004), "The Value of Human and Social Capital Investments for the Business Performance of Startups", *Small Business Economics*, Vol. 23, pp. 227-236.

Bruderl, J., Preisendorfer, P. and Ziegler, R. (1992), "Survival Chances of Newly Founded Business Organizations", *American Sociological Review*, Vol. 57 No. 2, pp. 227-242.

Carroll, G. R. and Mosakowski, E. (1987), "The Career Dynamics of Self-Employment", *Administrative Science Quarterly*, Vol. 32, pp. 570-589.

Chatterji, A. K. (2009), "Spawned with a silver spoon? Entrepreneurial performance and innovation in the medical device industry", *Strategic Management Journal*, Vol. 30, pp. 185-206.

Colombo, M. G., Delmastro, M. and Grilli, L. (2004), "Entrepreneurs' human capital and the start-up size of new technology-based firms", *International Journal of Industrial Organization*, Vol. 22, pp. 1183-1211.

Cooper, A. C., Gimeno-Gascon, F. J. and Woo, C. Y. (1994), "Initial Human and Financial Capital as Predictors of New Venture Performance", *Journal of Business Venturing*, Vol. 9 No. 5, pp. 371-395.

Davidsson, P. and Honig, B. (2003), "The role of social and human capital among nascent entrepreneurs", *Journal Business Venturing*, Vol. 18 No. 3, pp. 301-331.

De Clercq, D., Dimov, D. and Thongpapanl, N. (2010), "The moderating impact of internal social exchange processes on the entrepreneurial orientation–performance relationship", *Journal of Business Venturing*, Vol. 25, pp. 87-103.

Delmar, F. and Shane, S. (2003), "Does business planning facilitate the development of new ventures?", *Strategic Management Journal*, Vol. 24, pp. 1165-1185.

Delmar, F. and Shane, S. (2004), "Legitimizing first: Organizing activities and the survival of new ventures", *Journal of Business Venturing*, Vol. 19 No. 3, pp. 385-410.

Diamantopolous, A., Riefler, P. and Roth, K. P. (2008), "Advancing formative measurement models", *Journal of Business Research*, Vol. 61, pp. 1203-1218.

Dimov, D. (2010), "Nascent entrepreneurs and venture emergence: Opportunity confidence, human capital, and early planning", *Journal of Management Studies*, Vol. 47 No. 6, pp. 1123-1153.

Edwards, J. R. and Bagozzi, R. P. (2000), "On the nature and direction of relationships between constructs and measures", *Psychological Methods*, Vol. 5 No. 2, pp. 155-174.

Evans, D. S. and Leighton, L. S. (1989), "Some Empirical Aspects of Entrepreneurship", *The American Economic Review*, Vol. 79 No. 3, pp. 519-535.

Fiss, P.C. (2007), "A set-theoretic approach to organizational configurations", *Academy of Management Review*, Vol. 32, pp. 1180-1198.

Gabrielsson, J. and Politis, D. (2012), "Work experience and the generation of new business ideas among entrepreneurs: An integrated learning framework", *International Journal of Entrepreneurial Behavior and Research,* Vol. 18, pp. 48-74.
Gimeno, J., Folta, T. B., Cooper, A. C., and Woo, C. Y. (1997), "Survival of the fittest: Entrepreneurial human capital and the persistence of underperforming firms", *Administrative Science Quarterly*, Vol. 42, pp. 750-783.
Greckhamer, T., Misangyi, V.F., Elms, H. and Lacey, R. (2008), "Using qualitative comparative analysis in strategic management research: An examination of combinations of industry, corporate, and business-unit effects", *Organizational Research Methods*, Vol. 11, pp. 695-726.
Heise, D. R. (1972), "Employing nominal variables, induced variables, and block variables in path analysis", *Sociological Methods and Research*, Vol. 1, pp. 147-173.
Hipp, J. R. and Bollen, K. A. (2003), "Model Fit in Structural Equation Models with Censored, Ordinal, and Dichotomous Variables: Testing Vanishing Tetrads", *Sociological Methodology*, Vol. 33, pp. 267-305.
Hipp, J. R., Bauer, D. J. and Bollen, K. A. (2005), "Conducting Tetrad Tests of Model Fit and Contrasts of Tetrad-Nested Models: A New SAS Macro", *Structural Equation Modeling*, Vol. 12 No. 1, pp. 76-93.
Kline, R. (2005). *Principles and practice of structural equations modeling* (2nd ed), The Guilford Press, New York.
Krause, R., Acharya, A.G. and Covin, J.G. (2014), "Here I come to save the day: Proposing necessary and sufficient conditions for founder-CEO comeback" *Journal of Business Venturing Insights*, Vol. 1-2, pp. 26-30.
MacKenzie, S. B., Podsakoff, P. M. and Jarvis, C. B. (2005), "The problem of measurement model misspecification in behavioral and organizational research and some recommended solutions", *Journal of Applied Psychology*, Vol. 90 No. 4, pp. 710-730.
Mandl, C., Berger, E.S.C. and Kuckertz, A. (2016), "Do you plead guilty? Exploring entrepreneurs' sensemaking-behavior link after business failure", *Journal of Business Venturing Insights*, Vol. 5, pp. 9-13.
Martin, B.C., McNally, J.J. and Kay, M.J. (2013), "Examining the formation of human capital in entrepreneurship: A meta-analysis of entrepreneurship education outcomes", *Journal of Business Venturing*, Vol. 28, pp. 211-224.
Muñoz, P. and Dimov, D. (2015), "The call of the whole in understanding the development of sustainable ventures", *Journal of Business Venturing*, Vol. 30, pp. 632-654.
Pennings, J. M., Lee, K. and Witteloostuijn, A. v. (1998), "Human capital, social capital, and firm dissolution", *Academy of Management Journal*, Vol. 41 No. 4, pp. 425-440.
Ragin, C. C. (1987), *The Comparative Method: Moving Beyond Qualitative and Quantitative Strategies*, University of California Press, Berkeley, CA.
Ragin, C. C. (2000), *Fuzzy-Set Social Science*. University of Chicago Press, Chicago/London.
Ragin, C. C. (2006), *User's Guide to Fuzzy-Set/Qualitative Comparative Analysis 2.0,* Department of Sociology, University of Arizona, Tucson, AZ.
Ragin, C. C., Drass, Kriss A. and Davey, S. (2006), *Fuzzy-Set/Qualitative Comparative Analysis 2.0*, Department of Sociology, University of Arizona, Tucson, AZ.

Reynolds, P. D. and Curtin, R. T. (2008), "Business Creation in the United States: Panel Study of Entrepreneurial Dynamics II initial assessment", *Foundations and Trends in Entrepreneurship*, Vol. 4 No. 3, pp. 155-307.

Rotefoss, B. and Kolvereid, L. (2005), "Aspiring, nascent and fledgling entrepreneurs: An investigation of the business start-up process", *Entrepreneurship & Regional Development*, Vol. 17 No. 2, pp. 109-127.

Samuelsson, M. and Davidsson, P. (2009), "Does venture opportunity variation matter? Investigating systematic process differences between innovative and imitative new ventures", *Small Business Economics*, Vol. 33 No. 3, pp. 229-255.

Schoonhoven, C. B., Eisenhardt, K. M. and Lyman, K. (1990), "Speeding products to market: Waiting time to first product introduction in new firms", *Administrative Science Quarterly*, Vol. 35, pp. 177-207.

Stuart, R. W. and Abetti, P. A. (1990), "Impact of Entrepreneurial and Management Experience on Early Performance", *Journal of Business Venturing*, Vol. 5 No. 3, pp. 151-162.

Ucbasaran, D., Westhead, P. and Wright, M. (2008), "Opportunity identification and pursuit: Does human capital matter?", *Small Business Economics*, Vol. 30, pp. 153-173.

Unger, J.M., Rauch, A., Frese, M. and Rosenbusch, N. (2011), "Human capital and entrepreneurial success: A meta-analytical review", *Journal of Business Venturing*, Vol. 26, pp. 341-358.

Wagner, J. (2005), "Nascent and Infant Entrepreneurs in Germany. Evidence from the Regional Entrepreneurship Monitor (REM)", Working Paper Series in Economics, 1, University of Lüneburg,

West, G. P. and Noel, T. W. (2009), "The Impact of Knowledge Resources on New Venture Performance", *Journal of Small Business Management*, Vol. 47 No. 1, pp. 1-22.

Wiklund, J. and Shepherd, D.A. (2005), "Entrepreneurial orientation and small business performance: A configuration approach", *Journal of Business Venturing*, Vol. 20, pp. 71-91.

Zikic, J. and Ezzedden, S. (2015), "Towards a more integrated view of entrepreneurial careers: Qualitative investigation of the three forms of career capital and their relationships among high tech entrepreneurs", *International Journal of Entrepreneurial Behavior and Research,* Vol. 21, pp. 756-777.

TABLE 1
Descriptive Statistics and Correlations of the Human Capital Indicators

		Mean	St.dev.	1	2	3	4	5	6
1	Education	3.24	1.08	1.00					
2	Work experience	2.85	0.82	0.19	1.00				
3	Entrepreneurial experience	0.48	0.60	0.18	0.28	1.00			
4	Industry experience	1.71	1.21	0.06	0.27	0.11	1.00		
5	Managerial experience	2.03	1.06	0.27	0.60	0.37	0.25	1.00	
6	My skills and abilities will help me	4.49	0.63	0.07	0.04	0.06	0.20	0.08	1.00
7	My past experience will be very valuable	4.39	0.82	0.08	0.16	0.13	0.36	0.21	0.51

TABLE 2
Descriptive statistics for the Calibrated Human Capital Variables

	Education		**Work experience**		**Entrepreneurial experience**		**Industry experience**		**Managerial experience**	
	Value	% cases	Value	% cases	Value	% cases	Value	% cases	Value	% cases
Non member	2	23.8%	5	12.8%	0	54.5%	1	31.2%	1	16.2%
In between	3	39.0%	10	20.2%	1	21.1%	5	30.1%	5	37.0%
Member	4	37.2%	15	67.0%	2	24.4%	10	38.7%	10	46.8%

TABLE 3
Truth Table for the Empirical Typology of Human Capital based on Fuzzy Set Analysis

Human capital indicators					Number		
D	**W**	**E**	**I**	**M**	**of cases**	**Cum %**	**Outcome**
1	1	0	1	1	67	14.0%	1
1	1	1	1	1	64	27.4%	1
0	0	0	0	0	52	38.3%	1
1	1	0	0	1	38	46.2%	1
1	1	1	0	1	35	53.6%	1
0	1	0	1	1	30	59.8%	1
0	1	1	1	1	27	65.5%	1
1	0	0	0	0	24	70.5%	1
0	1	0	0	0	22	75.1%	1
0	1	0	1	0	19	79.1%	1
0	1	0	0	1	17	82.6%	1
0	1	1	0	1	13	85.4%	0
0	0	0	1	0	12	87.9%	0
1	1	0	0	0	10	90.0%	0
1	0	0	1	0	9	91.8%	0
1	1	1	0	0	7	93.3%	0
1	1	0	1	0	6	94.6%	0
1	0	0	1	1	4	95.4%	0
1	0	1	1	1	4	96.2%	0
0	0	1	0	0	3	96.9%	0
1	0	1	0	1	3	97.5%	0
0	0	0	0	1	2	97.9%	0
0	0	0	1	1	2	98.3%	0
0	1	1	1	0	2	98.7%	0
1	1	1	1	0	2	99.2%	0
0	0	1	1	0	1	99.4%	0
0	1	1	0	0	1	99.6%	0
1	0	1	0	0	1	99.8%	0
1	0	1	1	0	1	100.0%	0
0	0	1	0	1	0	100.0%	0
0	0	1	1	1	0	100.0%	0
1	0	0	0	1	0	100.0%	0

D = education; W = work experience; E = entrepreneurial experience; I = industry experience; M = managerial experience

TABLE 4
Multinomial Logit and Logit Estimation of Venture Emergence

	Multinomial logit estimation						Logit estimation		
	Likelihood of reaching:						Operating business vs. discontinuation		
	Discontinuation			Operating business					
Education	-0.12	(0.10)		-0.04	(0.13)		0.12	(0.13)	
Work experience	0.28	(0.16)		0.28	(0.23)		0.00	(0.22)	
Entrepreneurial experience	-0.20	(0.20)		-0.19	(0.23)		0.03	(0.24)	
Industry experience	-0.26	(0.10)	**	-0.03	(0.12)		0.24	(0.12)	*
Managerial experience	-0.15	(0.12)		0.21	(0.17)		0.35	(0.16)	*
Constant	0.68	(0.49)		-1.61	(0.69)	*	-2.42	(0.71)	***
Log-likelihood	-460.72						-169.75		
Chi-square	26.00	**					17.21	**	
N	453						291		

Note: Standard errors shown in parentheses.
* p < .05
** p < .01
*** p < .001

TABLE 5
Truth Table for Fuzzy Set Analysis of Venture Emergence

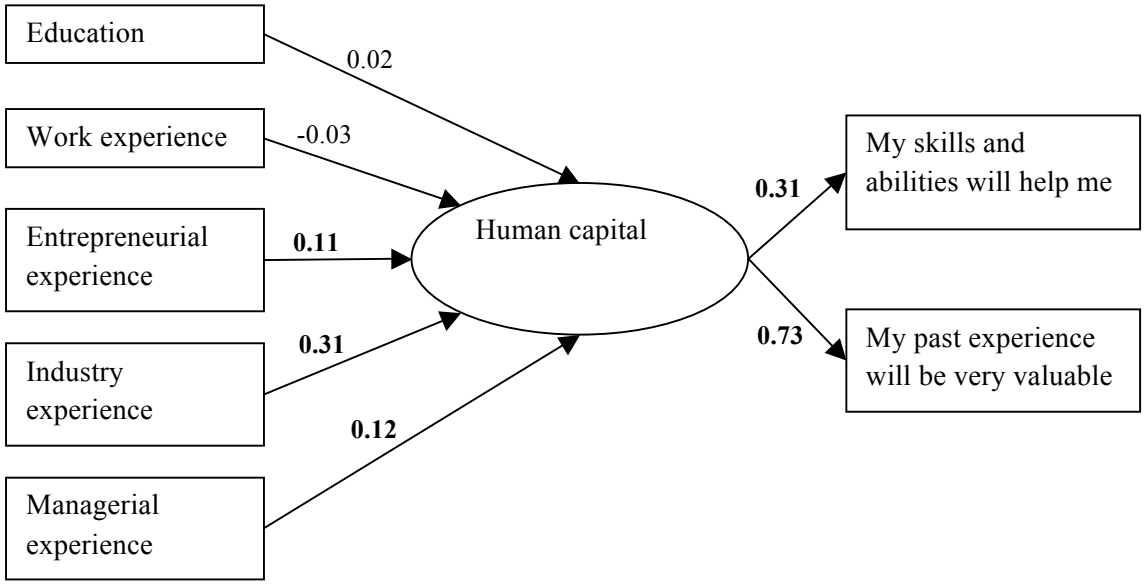
Human capital indicators					Number			Outcome criteria		
D	W	E	I	M	of cases	Cum %	Outcome	consist	pre	product
1	1	1	1	1	41	17.8%	0	0.63	0.31	0.20
1	1	0	1	1	30	30.9%	0	0.62	0.34	0.21
1	1	1	0	1	19	39.1%	0	0.61	0.30	0.18
0	0	0	0	0	18	47.0%	0	0.50	0.12	0.06
0	1	1	1	1	14	53.0%	1	0.69	0.41	0.28
1	1	0	0	1	13	58.7%	0	0.61	0.29	0.18
0	1	0	0	0	11	63.5%	0	0.49	0.07	0.03
0	1	0	0	1	9	67.4%	0	0.60	0.26	0.15
0	1	0	1	1	9	71.3%	1	0.68	0.37	0.25
0	1	1	0	1	9	75.2%	0	0.65	0.23	0.15
1	1	1	0	0	8	78.7%	1	0.67	0.34	0.23
0	1	0	1	0	7	81.7%	0	0.66	0.28	0.18
1	0	0	0	0	6	84.3%		0.57	0.20	0.12
1	1	1	1	0	6	87.0%		0.75	0.29	0.21
1	0	0	1	0	5	89.1%		0.67	0.16	0.11
1	0	1	0	1	4	90.9%		0.73	0.22	0.16
0	1	1	1	0	3	92.2%		0.75	0.25	0.19
1	0	1	0	0	3	93.5%		0.67	0.11	0.08
1	1	0	1	0	3	94.8%		0.68	0.29	0.20
0	0	0	1	0	2	95.7%		0.70	0.24	0.17
0	0	1	0	0	2	96.5%		0.77	0.28	0.22
1	0	1	1	0	2	97.4%		0.84	0.10	0.09
0	0	0	0	1	1	97.8%		0.71	0.06	0.04
0	0	1	1	0	1	98.3%		0.92	0.04	0.04
0	0	1	1	1	1	98.7%		0.91	0.20	0.19
0	1	1	0	0	1	99.1%		0.74	0.32	0.24
1	0	0	1	1	1	99.6%		0.73	0.16	0.12
1	1	0	0	0	1	100.0%		0.60	0.17	0.10
0	0	0	1	1	0	100.0%		0.76	0.18	0.14
0	0	1	0	1	0	100.0%		0.87	0.10	0.09
1	0	0	0	1	0	100.0%		0.68	0.09	0.06
1	0	1	1	1	0	100.0%		0.93	0.52	0.48

D = education; W = work experience; E = entrepreneurial experience; I = industry experience; M = managerial experience.

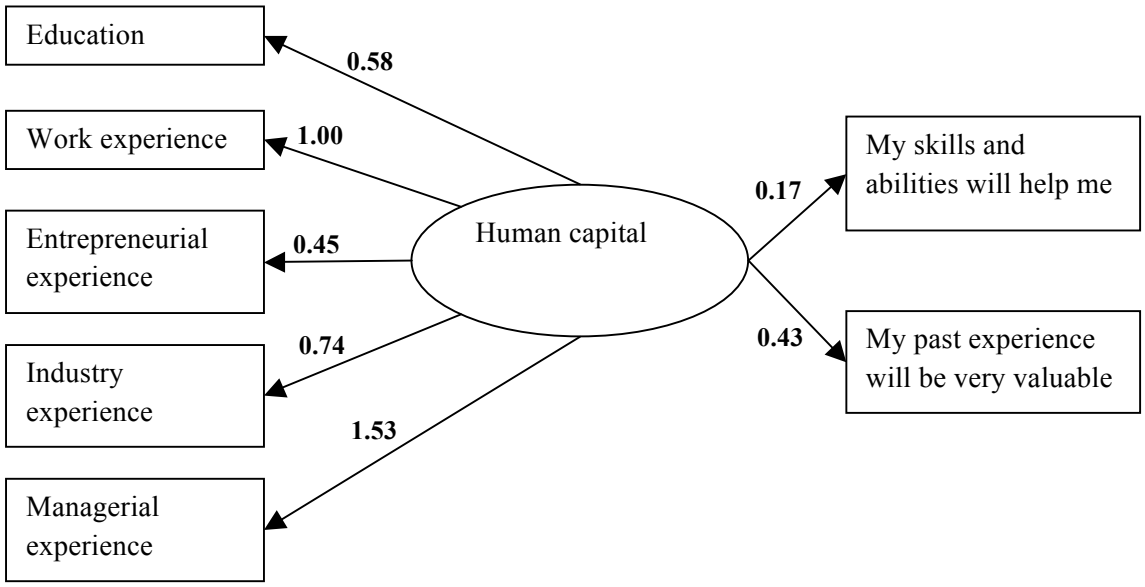
consist = Consistency; pre = proportional reduction in error.

FIGURE 1

Formative and Reflective Models of Human Capital



$\chi^2(4) = 6.0$, $p > .1$; GFI = .999, CFI = .999, RMSEA = .021.



$\chi^2(14) = 478.6$, $p < .001$; GFI = .898, CFI = .681, RMSEA = .167.

Coefficients shown in bold are significant at $p < .05$